ORIGINAL (Red)

15 MARCH 1977

NATIONAL CAPITAL AREA ENVIRONMENTAL
HEALTH ASSOCIATION (SEMINAR)
WASHINGTON, D.C.

MR. CHAIRMAN; LADIES AND GENTLEMEN;

THE SUBJECT ASSIGNED TO ME, NAMELY ARSENIC AND MERCURY PROBLEMS IN ALEXANDRIA, VIRGINIA IS RATHER COMPLEX AND LENGTHY. AN ENGLISH STATESMAN IN WRITING TO A FRIEND, APOLOGIZED BY ONCE STATING "HAD I HAD MORE TIME, I WOULD HAVE WRITTEN YOU A SHORTER LETTER". MY PURPOSE TODAY IS TO DISCUSS WITH YOU HOW OUR PROBLEM BEGAN AND WHAT WE DID ABOUT IT. HAD I HAD MORE TIME I TOO WOULD HAVE PREPARED A SHORTER SPEECH FOR YOU.

AS IN SO MANY THINGS, THE SITUATION DEVELOPED QUITE INNOCENTLY AND WITHOUT OSTENTATION. YOUR SPEAKER, IN MAKING A ROUTINE PATROL ALONG THE POTOMAC RIVER SHORE NOTED A YELLOWISH DISCOLORATION IN THE WATER OF ORONOCO BAY (figure 1). TRACING BACK FROM A STORM SEWER OUTLET THE SOURCE APPEARED TO BE THE NEARBY R. H. BOGLE COMPANY WHERE WORKERS WERE CLEANING THE INTERIOR OF AN EMPTY TANK CAR WITH A WATER HOSE. INVESTIGATION DISCLOSED THAT THE RUN-OFF ENTERED A STORM SEWER AND FROM THERE WENT INTO ORONOCO BAY. WE HAD THIS PROCEDURE STOPPED AT ONCE. HOWEVER, SINCE THERE WERE STORAGE TANKS ON THE PROPERTY PLUS SEVERAL TANK CARS WE FELT THERE EXISTED THE POTENTIAL FOR A CHEMICAL SPILL IN CASE OF FIRE, EXPLOSION OR JUST PLAIN CARELESSNESS BECAUSE THE COMPANY WAS ENGAGED IN FORMULATION OF HERBICIDES. AT ONE TIME THEY ALSO HANDLED PESTICIDES. HOWEVER, THEY HAD CEASED USING ARSENIC FOR ABOUT THE LAST 9 YEARS AT THE PLANT. WE REQUESTED THE STATE WATER CONTROL BOARD (SWCB) STAFF TO EVALUATE THE SITUATION AND INFORM US AS TO WHETHER WE HAD A PROBLEM.

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THE SWCB FIRST CHECKED FOR ARSENIC AND MERCURY CONTAMINATION OF RUN-OFF WATER INTO THE RIVER AND OF GROUND WATER BELOW THE PROPERTY SURFACE. OVER A PERIOD OF MANY MONTHS THEY CAME UP WITH NO MEASURABLE CONTAMINATION. THEY NEXT CHECKED FOR GROUND CONTAMINATION ON THE PROPERTY AND IN ORONOCO BAY AND FOUND:

1. ALARMING CONCENTRATIONS OF ARSENIC IN SURFACE SOIL AND IN SUB-SOIL TO A CONSIDERABLE DEPTH.
2. A MUCH LESSER CONCENTRATION OF ARSENIC IN THE SEDIMENT OF ORONOCO BAY.
3. A SMALL AMOUNT OF MERCURY IN SURFACE SOIL ON THE PROPERTY.

AS SOON AS WE OBTAINED THE FORMAL NOTICE OF THE ARSENIC SITUATION FROM THE SWCB WE NOTIFIED THE STATE HEALTH DEPARTMENT, THE CITY MANAGER AND THE HEALTH DIRECTOR THAT, IN OUR OPINION, WE HAD A SERIOUS PROBLEM WHICH REQUIRED IMMEDIATE CORRECTIVE ACTION.

HOW SERIOUS WAS THIS PROBLEM? ON ABOUT A 5-ACRE TOTAL TRACT WE HAD ARSENIC READINGS RANGING FROM 25 P.P.M. TO AROUND 29,000 P.P.M. (AT THIS MAXIMUM CONCENTRATION A SMALL HANDFULL OF DIRT CONTAINS A LETHAL DOSE. A LETHAL DOSE OF $AS_2 O_3$ IS ABOUT 120 Mg.). THE AVERAGE CONCENTRATIONS IN UNCONTAMINATED SOILS RANGE FROM 0.2 P.P.M. TO 40 P.P.M. IN THE U.S.

A MEETING WAS HELD AT THE ALEXANDRIA HEALTH DEPARTMENT ATTENDED BY ALL MAJOR CITY DEPARTMENT HEADS, THE CITY MANAGER, THE TWO OWNERS OF R.H. BOGLE COMPANY, AND TWO REPRESENTATIVES FROM THE SWCB. THE COMPANY WAS INFORMED OF THE PROBLEM AND WAS REQUESTED ORALLY AND BY CERTIFIED LETTER TO:

1. KEEP UNAUTHORIZED PERSONS OFF THE COMPANY PROPERTY.
2. DEVELOP A LONG-TERM SOLUTION TO CONTROL SURFACE RUN-OFF FROM THE PROPERTY AND TO EITHER REMOVE OR NEUTRALIZE THE CONTAMINATED SOILS TO THE EXTENT THEY NO LONGER POSE A PUBLIC HEALTH AND SAFETY HAZARD.

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THE COMPANY AGREED TO THESE STIPULATIONS. IT ERECTED A CHAIN-LINK FENCE AROUND ITS PROPERTY. IT HIRED A CONSULTANT TO ANALYZE THE PROBLEM AND TO COME UP WITH CORRECTIVE ACTION. IN THE MEANTIME THE ALEXANDRIA HEALTH DEPARTMENT IN COORDINATION WITH THE STATE WATER CONTROL BOARD CONTACTED THE FOLLOWING AGENCIES FOR ASSISTANCE (figure 2):

1. CHEMTREC (MANUFACTURING CHEMISTS ASSOCIATION)
2. VIRGINIA DEPARTMENT OF HEALTH
    a. DIVISION OF ENGINEERING
    b. BUREAU OF ENVIRONMENTAL HEALTH
    c. BUREAU OF EPIDEMIOLOGY
    d. BUREAU OF INDUSTRIAL HYGIENE
    e. BUREAU OF SANITARY ENGINEERING
    f. BUREAU OF SOLID WASTE AND VECTOR CONTROL
3. VIRGINIA OCCUPATIONAL SAFETY AND HEALTH AGENCY (VOSHA)
4. OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION (OSHA)
5. NATIONAL INSTITUTE OF OCCUPATIONAL SAFETY AND HEALTH (NIOSH)
6. CENTER FOR DISEASE CONTROL (CDC)
7. ENVIRONMENTAL PROTECTION AGENCY (EPA)
8. VIRGINIA STATE AIR POLLUTION CONTROL BOARD (SAPCB)
9. VIRGINIA STATE WATER CONTROL BOARD (SWCB)
10. U.S. DEPARTMENT OF AGRICULTURE
11. AMERICAN PUBLIC HEALTH ASSOCIATION
12. COUNCIL OF ENVIRONMENTAL QUALITY
13. DEPARTMENT OF THE INTERIOR
14. CORPS OF ENGINEERS

WE ALSO TOOK A SERIES OF SURFACE SOIL READINGS FOR ARSENIC AND MERCURY IN THE CONTAMINATED AREA AND IN OUTLYING SECTIONS OF ALEXANDRIA. THIS WAS TO DETERMINE THE EXTENT OF SURFACE CONTAMINATION AND THE AMBIENT OR BACKGROUND LEVELS

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IN OUR SOIL. WE ALSO MONITORED FOR AIR CONTAMINATION ON THE SITE AND NEARBY AREAS FOR BOTH ARSENIC AND MERCURY. CONCURRENTLY, IN COOPERATION WITH THE CENTER FOR DISEASE CONTROL, THE STATE HEALTH DEPARTMENT AND THE NATIONAL INSTITUTE FOR OCCUPATIONAL SAFETY AND HEALTH, THE ALEXANDRIA HEALTH DEPARTMENT CONDUCTED A COMMUNITY SURVEY OF BOGLE PLANT WORKERS AND NEARBY RESIDENTS FOR INDICATIONS OF ARSENIC POISONING. THE RESULTS OF THESE EXHAUSTIVE TESTS ON PERSONS SHOWED NO SIGNIFICANT ARSENIC OR MERCURY LEVELS OR SIGNS OF POISONING. THE AIR SAMPLES WERE ALSO BASICALLY NEGATIVE. FOR EXAMPLE, OUR HIGHEST READING FOR ARSENIC WAS 0.002 MICROGRAMS PER CUBIC METER OF AIR. (THE STANDARD IS 0.1 TO 1 MICROGRAM PER CUBIC METER OF AIR). WE OBTAINED NO MEASURABLE MERCURY CONTAMINATION.

IN ORDER TO ALLAY FEARS ON THE MERCURY SITUATION THE ALEXANDRIA HEALTH DEPARTMENT UNDERTOOK A CONCURRENT SURVEY OF THAT PROBLEM. IT WAS OUR OPINION THAT THE MERCURY LEVELS ON THE BOGLE PROPERTY WERE FROM SOURCES OTHER THAN THE R. H. BOGLE COMPANY OPERATION. WE SUSPECTED THE POTOMAC ELECTRIC POWER COMPANY GENERATING PLANT LOCATED ABOUT 2/3 OF A MILE NORTH OF THE R. H. BOGLE COMPANY SITE. IT USES COAL AS FUEL (NEARLY 1 MILLION TONS PER YEAR). WE REASONED THAT IF THE POWER PLANT IS THE SOURCE WE SHOULD GET READINGS OF MERCURY LEVELS COMPARABLE TO THE BOGLE SITE AT POINTS TO THE WEST AND NORTH OF THE POWER PLANT AT DISTANCES APPROXIMATING 2/3 MILES. IF THAT THEORY HELD THEN READINGS ON THE POWER PLANT GROUNDS SHOULD BE NO HIGHER THAN NORMAL AMBIENT LEVEL IN ALEXANDRIA SOILS. WE CALCULATED OUR TOTAL MERCURY OUTPUT FROM WHEN THE PLANT STARTED OPERATION (ABOUT 25 YEARS), OBTAINED MERCURY CONTENT OF COAL PLUS TONS USED, DETERMINED WIND-ROSE PATTERNS PLUS PLUME IMPACT AND CALCULATED THEORETICAL MERCURY LEVELS. OUR CALCULATED LEVELS WERE REMARKABLY CLOSE TO THE ACTUAL LABORATORY SAMPLES: (SURFACE SOILS).

1. BACKGROUND LEVEL Hg IN ALEXANDRIA-------- <0.5 p.p.m.

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2. LEVEL ON POWER PLANT SITE ---------- <0.5 p.p.m.
3. AROUND BOGLE SITE (2/3 MILE SOUTH OF POWER PLANT)---- 6.0 p.p.m.
4. SAILING MARINA (2/3 MILE NORTH OF POWER PLANT) ------ 5.7 p.p.m
5. CALCULATED LEVELS Hg ---------- 3.7 p.p.m.

THE ABOVE INFORMATION CONFIRMED WHAT WE HAD SUSPECTED. SOIL CONCENTRATION OF Hg WOULD REQUIRE A PERSON TO INGEST MANY MANY POUNDS OF SOIL TO OBTAIN A LETHAL DOSE (AROUND 10 LBS. FOR OUR HIGHEST READING). MERCURY IN THE AIR WAS ALSO NOT A PUBLIC HEALTH PROBLEM. UNDER THE WORST DISPERSION CONDITIONS THE AMBIENT MERCURY CONCENTRATIONS WOULD BE FAR LESS THAN 0.01 ug/m^3 FOR A 30-DAY AVERAGE. (THIS IS 100 TIMES LOWER THAN THE HEALTH LEVEL STANDARD OF 1.0 ug/m^3). THE RESULTS ALSO PROVED THAT GENERALLY THE Hg SOURCE WAS PRIMARILY THE POWER PLANT. THE GROUND SAMPLE READINGS CORRELATED CLOSELY THE IMPACT AREAS OF THE STACK EMISSION PLUMES.

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WHEN THE CONSULTANT'S REPORT WAS COMPLETED IT WAS ANALYZED IN DETAIL AND THE ALEXANDRIA HEALTH DEPARTMENT THEN CALLED A MEETING OF ALL MAJOR PARTICIPANTS TO RESOLVE VARIOUS CONTROVERSIAL ASPECTS AND TO AGREE UPON ACTIONS. IN SUMMARY THESE AGREEMENTS WERE: (Figure 3).

1. MOST CONTAMINATION IS WITHIN FIRST 15 FEET OF THE SURFACE AND IS PRIMARILY ON THE BOGLE PROPERTY.
2. DEGREE OF CONTAMINATION VARIES CONSIDERABLY AND IS "SPOTTY".
3. MERCURY CONTAMINATION DOES NOT APPEAR TO BE A PUBLIC HEALTH PROBLEM. THE HEALTH DEPARTMENT REPORT AND ANALYSIS GIVES A REASONABLE EXPLANATION.
4. GROUND WATER AND RIVER WATER HAVE LITTLE OR NO MEASURABLE ARSENIC CONTAMINATION.
5. PRESENT PROBLEM IS PRIMARILY INORGANIC ARSENIC IN SOIL AND IN SEDIMENT OF ORONOCO BAY.
6. TESTING OF BOGLE EMPLOYEES AND NEARBY RESIDENTS FOR ARSENIC WAS NEGATIVE.
7. THE NIOSH REPORT RECOMMENDS A GENERAL HOUSECLEANING IN THE INTERIOR OF SOME BOGLE STRUCTURES. ARSENIC DEPOSITS WERE FOUND ON RAFTER TOPS AND SIMILAR AREAS. THEY FOUND NO EVIDENCE OF WORKER CONTAMINATION.
8. THE HEALTH DEPARTMENT HAS ISSUED, AS OF JULY 15, 1976, GUIDELINES TO BE FOLLOWED FOR CONSTRUCTION IN ARSENIC - CONTAMINATED AREAS. COPIES WERE SENT TO INVOLVED DEPARTMENTS OF CITY, STATE AND EPA. ALSO TO UTILITY COMPANIES AND THE PRINCESS STREET TOWNHOUSE CLUSTER DEVELOPER.

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9. SOME HERBICIDES AND INSECTICIDES WERE FOUND IN SEVERAL SAMPLES ANALYZED BY THE SWCB BUT NOT IN SIGNIFICANT AMOUNTS.

10. DAMES AND MOORE REPORT DOES NOT COVER ENOUGH OPTIONS FOR CORRECTING PROBLEM ON THE BOGLE PROPERTY NOR IS IT SPECIFIC AS TO CORRECTIVE ACTION ON ADJACENT CONTAMINATED AREAS.(CONSULTANT)

11. IF THE BOGLE PROPERTY IS NOT DEVELOPED SOON THEN IN ALL PROBABILITY SOME IMMEDIATE LONG-TERM CONTROLS MUST BE INVOKED. (TEMPORARY SURFACING WITH TAR AND CHIPS REQUIRED).

12. THE SWCB HAS ASKED THE EPA FOR ASSISTANCE (FUNDS) TO BE USED FOR DEALING WITH THE ARSENIC CONTAMINATION OF SEDIMENT IN ORONOCO BAY AND THE RIVER BED.

13. THE SAPCB WAS ASSURED BY THE ALEXANDRIA HEALTH DEPARTMENT THAT IF CONTAMINATED SOILS ARE LIKELY TO BE DISTURBED BY CONSTRUCTION THEN CONTROL MEASURES WILL BE UTILIZED TO PREVENT THESE SOILS FROM BECOMING AIRBORNE.

14. ALL AGREED WITH THE AREA DELINEATED IN THE HEALTH DEPARTMENT REPORT WHERE WELL DRILLING OR WELL USAGE WAS TO BE PROHIBITED. THE STATE HEALTH DEPARTMENT BROUGHT OUT THE POINT THAT IN PLACING WATER LINES WE MUST BE CAREFUL TO AVOID POSSIBLE FUTURE BACK-SIPHONAGE.

15. EPA PLANS ON ENTERING INTO A CONSENT AGREEMENT WITH THE R.H. BOGLE COMPANY IN WHICH WILL BE STIPULATED BASIC CONTROL AND CORRECTIVE ACTIONS REQUIRED BY THE COMPANY.

16. THE CITY HEALTH DEPARTMENT IN COORDINATION WITH THE DEPARTMENT OF TRANSPORTATION AND ENVIRONMENTAL SERVICES WILL DEVELOP A VAULT DESIGN SUITABLE FOR DISPOSAL OF CONTAMINATED MATERIALS.

SEVERAL MONTHS LATER THE CITY OF ALEXANDRIA ORGANIZED A STANDING COMMITTEE ON CONTAMINATED LANDS. THE COMMITTEE IS CHAIRED BY THE CITY MANAGER'S OFFICE. IT MEETS AS REQUIRED TO REVIEW THE STATUS OF ALL PROJECTS AND ACTIVITIES

THAT FALL WITHIN ITS PURVIEW. ONE OF ITS RELEASES THROUGH THE CITY MANAGER HAS BEEN A SET OF "ADMINISTRATIVE PROCEDURES FOR CONTROL OF CONTAMINATED LAND". INCLUDED THERIN ARE SPECIFIC CONTROL PROCEDURES FOR ARSENIC (FIGURE 4). THESE ARE AS FOLLOWS:

1. ALL DESIGNS MUST PRECLUDE BASEMENTS, SWIMMING POOLS. AND SIMILAR ITEMS THAT REQUIRE EXCESSIVE EXCAVATION IN AREAS OF CONTAMINATION OVER 200 PARTS PER MILLION. DEVELOPMENT MUST MINIMIZE EXCAVATION AND MAXIMIZE STABILIZATION IN PLACE.

2. CONTAMINATED AREAS OF OVER 200 PARTS PER MILLION MUST BE COVERED WITH A MINIMUM OF 18 INCHES OF COMPACTED IRON-RICH CLAY PLUS A PROTECTIVE LAYER OF EITHER TOP SOIL, GRAVEL, VEGETATIVE COVER, HARDSTANDING, OR STRUCTURES OR IT MUST BE REMOVED UNDER THESE GUIDELINES. UTILITY LINES (SEWER, WATER, ETC.) MUST BE PLACED PRIOR TO THE PLACING OF THE IRON-RICH CLAY LAYER IN ORDER TO FORESTALL POSSIBLE BREACHING OF THE SEAL.

3. WATER AND SEWER LINES IN THE CONTAMINATED AREAS OF OVER 40 PARTS PER MILLION MUST BE WRAPPED IN POLYETHYLENE TO SAFEGUARD AGAINST THE EFFECTS OF POTENTIAL NEGATIVE LINE PRESSURE. BACKFILLING OF ALL WATER AND SEWERAGE LINE EXCAVATIONS MUST BE ACCOMPLISHED BY UTILIZATION OF SELECTED BACKFILL MATERIALS, CONCRETE, OR SEALED PIPE ENCASEMENTS.

4. DRILLING OF WELLS OR GROUND WATER WITHDRAWALS BY WELLS WILL BE RESTRICTED FROM THE AREA INSIDE THE MADISON STREET ON THE NORTH, ROYAL STREET ON THE WEST, PRINCESS STREET ON THE SOUTH, AND THE POTOMAC RIVER ON THE EAST.

5. DURING CONSTRUCTION IN ANY CONTAMINATED AREA OF OVER 40 ppm

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VERY STRINGENT AND CONTINUOUS FUGITIVE DUST CONTROL MEASURES MUST BE APPLIED. CONSTRUCTION MUST BE SO SCHEDULED THAT A MINIMUM OF PEOPLE ARE EXPOSED TO ARSENIC FOR THE SHORTEST POSSIBLE PERIOD OF TIME. PUBLIC HEALTH AND SAFETY IS PARAMOUNT BOTH FOR THE PUBLIC AND THE WORKERS.

6. FOR CONSTRUCTION IN CONTAMINATED AREAS OF OVER 40 PPM, WORKERS PROTECTION MUST BE SUCH AS TO MEET FEDERAL, STATE, AND CITY STANDARDS FOR PERMISSIBLE EXPOSURE LIMITS. THIS MUST INCLUDE A PROGRAM OF PERSONAL HYGIENE TO PREVENT TRANSPORT OF ARSENIC INTO HOMES OF WORKERS.

7. EXCESS CONTAMINATED SOILS MUST BE DISPOSED OF EITHER BY PROPER DILUTION FOR CONTAMINATION LESS THAN 200 PPM OR BY DISPOSAL IN A FEDERAL, STATE AND CITY - APPROVED VAULT AND SITE FOR CONTAMINATED MATERIAL OVER 200 PPM.

8. EXPOSED SURFACE-CONTAMINATED SOILS OVER 40 AND LESS THAN 200 PPM IN AREAS WHERE IMPERVIOUS SURFACE CANNOT BE READILY INSTALLED i.e. GRASS STRIP ADJACENT TO ORONOCO STREET, MUST BE EXCAVATED AND REPLACED WITH UNCONTAMINATED MATERIAL. THE CONTAMINATED MATERIAL REMOVED MUST BE DISPOSED OF AS PER #7 ABOVE.

9. WHERE SUB-SURFACE CONTAMINATION IS OVER 40 AND LESS THAN 200 PPM, THE SOIL IN GARDENS OR FLOWER BEDS WILL BE TREATED WITH LIME TO REDUCE THE POSSIBILITY OF ARSENIC UPTAKE BY THE PLANTS.

10. WHEN TREES AND SHRUBS ARE TO BE PLANTED WHERE SUB-SURFACE CONTAMINATION IS OVER 40 PPM, THEY WILL BE PLACED IN WELLS (MINIMUM 18" OVERSIZE IN ALL DIRECTIONS) IN WHICH CLAY SOIL AT LEAST 18" THICK SHALL

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LINE THE PERIMETER AND BOTTOM OF THE HOLE. THE TREE BALL AND NECESSARY TOP SOIL SHALL THEN BE PLACED WITHIN SAID CLAY BARRIER.

SOME WORK IS ALREADY UNDERWAY IN THE ARSENIC-CONTAMINATED AREA. TO DATE WE HAVE HAD NO DIFFICULTIES. BEFORE ACTUAL CONSTRUCTION BEGINS WE MEET WITH THE OWNER AND THE CONTRACTOR TO DISCUSS DETAILS OF CONTROL PROCEDURES AND TO ANSWER QUESTIONS THERE HAS TO BE CONSTANT SURVEILLANCE. IN ALL CASES THE NUMBER 1 OBJECTIVE IS TO PROTECT THE WORKER AND THE PUBLIC. OUR GREATEST SINGLE PROBLEM IN THE PERIOD INVOLVED (ABOUT 1 YEAR) HAS BEEN THE NEWS MEDIA. AT FIRST THEY LITERALLY HOUNDED US DAY AND NIGHT. THEY SEEMED TO THINK THAT WE WERE TRYING TO HIDE SOMETHING FROM THEM AND THE PUBLIC. IT WAS VERY DIFFICULT FOR THEM TO EVENTUALLY REALIZE THAT WE WERE DOING OUR UTMOST TO DETERMINE (1) EXTENT AND DEGREE OF CONTAMINATION AND (2) THE BEST WAY TO NEUTRALIZE THE CONTAMINATED SOILS.

ALL OF THE ABOVE HAD TO BE DONE UNDER PRESSURE IN A GOLD-FISH BOWL ATMOSPHERE. TO COMPOUND THE PROBLEM THERE WAS VERY LITTLE INFORMATION AVAILABLE ANYWHERE THAT GAVE CONTROL SPECIFICS. MOST OF THE LATTER HAD TO BE PIONEERED BY US. WE HAVE TRIED TO FOLLOW A CONSERVATIVE APPROACH IN OUR GUIDELINES AND RECOMMENDATIONS BECAUSE PUBLIC HEALTH AND SAFETY ARE OUR TWO PARAMOUNT OBJECTIVES.

A VERY INTERESTING HIGHLIGHT IN OUR RESEARCH WAS CONTRIBUTED BY DR. EDWIN WOOLSON, U.S. DEPARTMENT OF AGRICULTURE. HE FURNISHED THE FOLLOWING INFORMATION:

"ARSENIC IN THE SOIL IN QUANTITIES OF 200-300 PPM PRESENT NO SERIOUS THREAT TO PLANT LIFE. ABOVE 1,000 PPM SERIOUS SIDE EFFECTS DEVELOP IN ALL PLANT LIFE. TREES ARE IMPAIRED

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BECAUSE THE ARSENIC ACTS AS A ROOT PRUNER OR GROWTH RETARDANT AND INHIBITOR TO THE MAIN TAP ROOT.

"THE ARSENIC COMPOUND REFERRED TO IS SODIUM ARSENATE AND IS USUALLY FOUND CLOSE TO CHEMICAL MANUFACTURING PLANTS. THE TWENTY-FOUR INCH (24") LAYER COMPOSED OF IRON-RICH CLAY (18') AND TOPSOIL (6") WILL BE SUFFICIENT TO SUSTAIN PLANT LIFE SUCH AS GRASS AND SHRUBS WITH SHALLOW ROOT SYSTEMS. A TREE WITH A MAIN TAP ROOT WILL BE SUBJECT TO THE PRUNING EFFECT OF THE SODIUM ARSENATE.

"THERE IS NO NEED TO WORRY ABOUT PLANTS AND TREES TRANSMITTING TOXIC ELEMENTS FROM AN ARSENIC-SATURATED SOIL TO HUMANS. THE PLANTS WILL DIE AT AN EARLIER LEVEL THAN THAT WHICH MIGHT JEOPARDIZE HUMAN LIFE."

THANK YOU FOR THE PRIVILEGE OF APPEARING BEFORE THIS GROUP. IF YOU HAVE ANY QUESTIONS I AM AT YOUR DISPOSAL FOR WHATEVER TIME IS NOW AVAILABLE.

HANS G. JEPSON, P.E.
ENVIRONMENTAL ENGINEER
HEALTH DEPARTMENT
ALEXANDRIA, VIRGINIA

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DATE: OCTOBER 20, 1976

TO: ALL DEPARTMENT HEADS

FROM: DOUGLAS HARMAN, CITY MANAGER

SUBJ: ADMINISTRATIVE PROCEDURES FOR CONTROL OF CONTAMINATED LAND

As of today, I am implementing administrative procedures for the control of contaminated lands. These procedures are in effect and are to be followed by all departments.

A copy of these procedures are attached. These adopted procedures are to be reviewed and discussed with your staff and implemented immediately.

If you have any questions as to your responsibility as outlined in these procedures, let me know.

Any necessary changes can be made or any suggested additions can be given to the committee for consideration.

Please inform me of any immediate changes needing to be made.

mdg

Attachment

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ADMINISTRATIVE PROCEDURES FOR CONTROL OF CONTAMINATED LAND ALEXANDRIA, VIRGINIA

OCTOBER 20, 1976

A. PROBLEM

The City must determine appropriate public actions regarding the use, development, and control of land which has become contaminated with substances posing a danger to public health or to marine life. For example, in the past several years, some sites have been found to contain more methane gas than may be considered safe for conventional construction. There is also some land in the City that is contaminated with arsenic to such a degree as to warrant special precautionary measures or controls in its development or usage.

In the future, other types and degrees of contamination may be discovered which will be considered to warrant special measures or controls. Specific procedures and guidelines are necessary to assure that the public health and safety will not be compromised now or in the future. Experience indicates a need for general administrative procedures for cases involving any type of contaminant as well as specific and technical procedures and guidelines for specifically identified conditions. These procedures will not only help to protect the City but also the public, the developer, and the landowner.

The specific precautions which must be taken to protect the public and the environment will vary and depend upon:

1) the type of contaminant
2) the degree and extent of contamination
3) the location

Each situation will require an individual and specific solution determined through appropriate technical reviews. It is for this reason that the following procedures are implemented. These procedures will be strengthened over time as knowledge of specific problems allows additional technical solutions to these types of problems.

B. GENERAL ADMINISTRATIVE RESPONSIBILITIES

The following City agencies have responsibilities for specific functions and activities regarding contaminated lands:

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1) The Office of the City Manager has overall responsibility for the effective implementation of these procedures.

2) The Department of Planning and Community Development, in cooperation with the Health Department, has responsibility for identification of contaminated areas and technical coordination with other City departments and the Planning Commission regarding any proposed land use control measures.

3) The Health Department will formulate the necessary public health and safety requirements needed in each particular case. It will coordinate the participation of federal and state agencies in the analysis of health hazard issues and on the formulation of technical solutions to these land problems.

4) The Department of Transportation and Environmental Services will ensure that all public works in the area conform to public health and safety requirements. It will also ensure that site plans, street opening permits, and plats involving an area with know contamination are so notated on appropriate documents to indicate the presence and extent of contamination. The department will monitor implementation of specified requirements.

5) The Department of Building and Mechanical Inspections will inform all appropriate departments of all applications for construction permits of any type and for demolition permits related to a contaminated site. The department will assure that all required procedures have been followed prior to the issuance of any permit and that the work authorized is performed in accordance with these procedures. The department will also assure that all buildings are designed and constructed in such a manner that the contaminant will not affect the health or safety of the building occupants or the public.

6) The Department of Recreation and Cultural Activities will inspect all plantings in such areas to determine that they conform to the applicable control procedures and policies.

7) All departments will plan, direct, and supervise all activities in accordance with the developed procedures to assure that development and construction on contaminated lands is safe and feasible. The City Manager will be notified of any concern or question related to the use of these procedures in any activity such as the special use permit, site plan, or building permit process.

8) The City Manager will refer to the City Attorney any matters relating to aspects of restraints on land use or land records for appropriate action to protect City interests and to protect future owners from unknowingly acquiring contaminated sites. All suggestions for ordinances to enhance the ability of the City to implement effective controls on contaminated land will be referred to the City Attorney.

9) A standing committee chaired by the City Manager's Office composed of staff of the Department of Planning and Community Development, the Health Department, the Department of Transportation and Environmental Services and the Department of Building and Mechanical Inspections will meet as required to review the status of all projects and activities covered by these procedures and to review and monitor all activities related to these procedures. The City Attorney and appropriate City staff will be invited to participate at each of the meetings of the committee.

10) Each respective department will develop detailed operating procedures which will cover all functions of the departments referred to in the above.

11) These procedures and guidelines will be reviewed semi-annually to make necessary changes.

12) The City Manager will issue an administrative regulation incorporating these procedures after a review and comment period.

13) The City Manager will refer to the City Council for consideration any major problem of known soil contamination where there is a question as to the health and safety of the City or there is a question as to whether plans developed according to these procedures are not adequate to protect the health and safety of the public.

C. SPECIFIC CONTROL PROCEDURES

Arsenic:

The degree of arsenic contamination varies greatly. These general requirements are set so that they address the variance as well as the type of contamination. They are drawn from the reports and recommendations as well as the standards prepared to date by the federal, state, city, and private agencies.

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1) All designs must preclude basements, swimming pools, and similar items that require excessive excavation within areas of contamination over 200 parts per million. Development must minimize excavation and maximize stabilization in place.

2) Contaminated areas of over 200 parts per million must be covered with a minimum of 18 inches of compacted iron-rich clay plus a protective layer of either top soil, gravel, vegitative cover, hardstanding, or structures or it must be removed under these guidelines. Utility lines (sewer, water, etc.) must be placed prior to the placing of the iron-rich clay layer in order to forestall possible breaching of the seal.

3) Water and sewer lines in the contaminated areas of over 40 parts per million must be wrapped in polyethylene to safeguard against the effects of potential negative line pressure. Backfilling of all water and sewerage line excavations must be accomplished by utilization of selected backfill materials, concrete, or sealed pipe encasements.

4) Drilling of wells or ground water withdrawals by wells will be restricted from the area inside of Madison Street on the North, Royal Street on the West, Princess Street on the South, and the Potomac River on the East.

5) During construction in any contaminated area of over 40 parts per million, very stringent and continuous fugitive dust control measures must be applied. Construction must be so scheduled that a minimum of people are exposed to arsenic for the shortest possible period of time. Public health and safety is paramount both for the public and the workers.

6) For construction in contaminated areas of over 40 parts per million, worker protection must be such as to meet federal, state, and City standards for permissible exposure limits. This must include a program of personal hygiene to prevent transport of arsenic into homes of workers.

7) Excess contaminated soils must be disposed of either by proper dilution for contamination less than 200 parts per million or by disposal in a federal, state and City-approved vault and site for contaminated material over 200 parts per million.

8) Exposed surface-contaminated soils over 40 and less than 200 parts per million in areas where impervious surface cannot be readily installed, i.e. grass strip adjacent to Oronoco Street, must be excavated and replaced with uncontaminated material. The contaminated material removed must be disposed of as per #7 above.

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9) Where sub-surface contamination is over 40 and less than 200 parts per million, the soil in gardens or flower beds will be treated with lime to reduce the possibility of arsenic uptake by the plants.

10) When trees and shrubs are to be planted where sub-surface contamination is over 40 parts per million, they will be placed in wells (minimum 18" oversize in all directions) in which clay soil at least 18" thick shall line the perimeter and bottom of the hole. The tree ball and necessary top soil shall then be placed within said clay barrier.

Methane and Other Gases:

1) Any site located within 1000 feet of a known former sanitary landfill, dump or disposal area, unless actual sub-surface investigation of the site discloses no combustible gas is present, and any site with sub-surface indications of combustible gas shall be regarded as potentially hazardous.

2) Buildings or structures erected on such potentially hazardous sites shall be designed to afford appropriate protection against the accumulation of hazardous quantities of combustible gas.

3) The design and supporting data therefore shall meet all requirements of the Department of Building and Mechanical Inspections.

4) The Fire Department shall also review and comment on any such design and shall evaluate the need for and require where necessary any sampling, indicating or warning devices it deems necessary.

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COMMONWEALTH of VIRGINIA

STATE WATER CONTROL BOARD
2111 Hamilton Street

...ome T. Jansen
...cutive Secretary
...Office Box 11143
...nd, Virginia 23230
...04)786-1411

March 5, 1976

Dr. Alvin Morris
Acting Regional Administrator
Region III, EPA
6th & Walnut Streets
Philadelphia, Pennsylvania

Dear Dr. Morris:

In response to your telegram of March 2, 1976 to Secretary Shiflet regarding the arsenic-contaminated environment in and around the R. H. Bogle Company in Alexandria, Virginia, we are pleased to advise you of the exact investigative status of each of your listed environmental concerns.

In addition, we are advising you of our current plans for the implementation and fulfillment of more detailed and broader investigative analyses of the contaminated soils, sediments, and waters.

1. Air Pollution - Status: The Virginia Air Pollution Control Board's nearest monitoring station is near the Shirlington area near I-95 (Shirley Highway) approximately three miles northwest of the Bogle area. This distance is too great for reliance on this station's data. However, the City of Alexandria Health Department has a monitoring station on top of its building four blocks due west of the Bogle property. Furthermore, the City Health Department, when the emergency situation surfaced just recently, placed four additional sensors in close juxtaposition to the Bogle property's perimeter. Preliminary analysis of these sensors (data first available March 4, 1976) indicates that the arsenic levels range from 0.04 $\mu gm/m^3$ to 0.14 ugm/m^3. The normal levels of arsenic in the air are 0.1 to 1.0 $\mu gm/m^3$. The suggested arsenic standard in the air is 3.0 $\mu gm/m^3$. The preliminary data indicate that there is no arsenic problem in the air.

Future Plans: The City of Alexandria will complete the air analyses soon from all sensors and continue its monitoring program in the area.

2. Soil Contamination - Status: Samples of surface soils taken by the State Water Control Board (SWCB) on the Bogle site from 0 to 84 inches have shown arsenic concentrations ranging from 656 ppm to 27,700 ppm. Concentrations generally decrease with depth. Currently, approximately 46 surface soil samples have been taken, 17 as late as March 4, 1976. A single soil sample, taken by the SWCB on February 26, 1976, and analyzed by the Corps of Engineers Washington Aqueduct Laboratory (COE) revealed

a mercury concentration in excess of 30 ppm. The report on this analysis has not yet been received from the COE lab. SWCB sampling on March 1 and March 4 will be analyzed for both arsenic and mercury. Twenty-two samples were taken on those two dates. Five samples were taken off the Bogle property at an adjoining warehouse site.

Future Plans: A test-drilling program will be conducted in and around the Bogle property to delineate the entire extent of both arsenic and mercury contamination. Our Northern Regional Office (NRO) has mapped out a proposed drilling program which will include approximately 18 test holes around the suspected zone of contamination. The horizontal distance between test holes will be approximately 100 feet. Test depths will range from the surface to 55 feet. Several test holes may extend to the 100-foot range. This determination will be made by the supervising geologist.

We hope that the test holes can be drilled, analyses of samples made and a further course of action determined within three weeks.

3. Groundwater Contamination - Status: Analyses of seven groundwater samples taken to date show that arsenic is present in concentrations ranging from 0.22 mg/l to 210 mg/l. The center of the Bogle property appears at this time to have a heavy concentration. The present known depth of the arsenic contamination is 8 to 10 feet.

Future Plans: Groundwater samples will be taken in conjunction with the subsurface soil sampling program. Groundwater samples will be taken at the 22-32 foot depths and at 44-54 foot depths. In the center of the most heavily contaminated zone, three wells will be sampled at ten-foot intervals.

4. Surface Water or Runoff Contamination - Status: Approximately ten samples of surface water runoff have been obtained. Arsenic concentrations range from 2 to 28 mg/l. As a strictly interim measure, filter berms were emplaced encompassing the three lot drains on the Bogle property. This fairly well takes care of all property drainage.

Future Plans: Future permanent correction of contamination by surface water runoff will depend upon the evaluation of all data pertinent to the situation. The final corrective measures should solve the problem. If the chosen projected timetable for final resolution by corrective means is achievable, then the estimated earliest implementation start-date (provided the contaminated area is adjudged restricted to the Bogle property) for problem correction is perhaps within one month. The NRO will continue sampling the storm drains for levels of contaminants.

Comment: For increased reliability in the removal of contaminants, the filter media in the temporary runoff prevention filter berms should more properly be activated carbon. However, if a permanent solution is imminent, present interim measrues are considered acceptable.

5. Bay and River Water Contamination - Status: Five samples have been taken in the waters of Oronoco Bay. Analyses have not yet been returned from the lab. Water analyses from above Bogle to the Woodrow Wilson Bridge obtained by the Corps of Engineers' Washington Aqueduct Division on February 23, 1976 following a storm event on February 22, 1976 indicate that only common background levels of arsenic are present in the Potomac River near the Bogle area (about 0.001 mg/l). These arsenic levels are nearly identical to arsenic concentrations in the River at Great Falls.

Future Plans: The SWCB with the COE's assistance, will continue to monitor water quality in the Bay and in the River.

6. Bay and River Sediment Contamination - Status: Twelve sediment samples from Oronoco Bay have been obtained to date. Analyses indicate that arsenic concentrations range from 39.9 ppm to 2780 ppm. Sample depths ranged from surface to three feet. Fifteen samples have been obtained in the Potomac River near the Bogle property. Ten samples have currently been analyzed. Arsenic concentrations from 0.5 ppm to 4.3 ppm have been found, with only three samples indicating arsenic levels in excess of 3.4 ppm. Present data indicate that arsenic contamination in the Potomac River sediment is very slight; however, more data is required to settle the question.

Future Plans: We are still awaiting analyses from samples taken March 4, 1976. These analyses will enable us to plan for future data needs.

Study Comments

Test Drilling Rig: Conversations with R. H. Bogle's attorney, Mr. Hugh Blankenship, revealed that apparently R. H. Bogle has retained the engineering consulting firm of Dames & Moore to do site work pertaining to the Bogle problem. Mr. T. M. Schwarberg requested the attorney to have Dames & Moore work with the SWCB engineers and geologists familiar with the problem to design the most effective sampling program possible under somewhat severe time constraints. A test drilling start time early in the week of March 8 appears to be possible. Mr. Schwarberg told the attorney that the SWCB needed a commitment on a drilling rig as soon as possible.

Sampling Permission: Attorney Blankenship didn't object to his having to obtain permission of all affected owners for the sampling program. Mr. Blankenship was made aware of our severe time constraint, in that an early drilling time of next week is most desirable in light of the critical nature of the problem.

Utility Lines: The City of Alexandria, Department of Public Works (according to the Director of the City Health Department) will assist in staking out all known and unknown buried utility lines in order to avoid accidents.

Laboratory Analyses: Mr. Daniel Snyder, EPA Administrator, Region III, offered to Mr. T. M. Schwarberg (who accepted) the complete cooperation of EPA's laboratory facilities for our effort. EPA's Mr. Ralph Rhoades will coordinate with Mr. Schwarberg for all lab work. It is estimated that the State Division of Consolidated Laboratory Services (DCLS) will be sent approximately 30 to 60 samples over a two-week period for analysis. Dr. Jackson of the State Health Department indicates that because of DCLS's tremendous backlog resulting from kepone, DCLS can only handle approximately 20 to 30 samples per week for this effort.

If all goes well, and if we are extremely lucky, perhaps we can have most of the data back within two weeks. The estimated turn-around time period for receiving all analyses necessary to make a sound judgment as to disposition of the problem is three weeks. A one-month time period for a judgment